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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,790	04/11/2001	Michael J. Lodes	210121.512	1956

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[REDACTED] EXAMINER

WHISENANT, ETHAN C

[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

1634

DATE MAILED: 12/10/2002

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/833,790	Applicant(s) LODES ET AL.
	Examiner Ethan Whisenant, Ph.D.	Art Unit 1634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 18 September 2002.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 2,5-7,9,10,12,13 and 15 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1,3,4,8,11 and 14 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____.
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)
 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 and 7. 6) Other: _____

DETAILED ACTION

1. Applicant's election of Group I (Claims 1, 3-4, 8 11 and 14 & SEQ ID NO: 365) in the response filed 18 SEP 02 (i.e. paper Nos. 9-11) is acknowledged. Accordingly, Claims 2, 5-7, 9-10, 12-13 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. It is noted that the applicant did not distinctly and specifically point out any supposed errors in the restriction requirement, therefore the election has been treated as an election without traverse (MPEP § 818.03(a)). The restriction requirement has been reconsidered, is deemed proper and is therefore, herein made **FINAL**. An action on **Claim(s) 1, 3-4, 8, 11 and 14 as they relate to SEQ ID NO: 365** follows.

SEQUENCE RULES

2. This application complies with the sequence rules and the sequences have been entered by the Scientific and Technical Information Center.

35 USC § 101

3. 35 U.S.C. § 101 reads as follows:

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title".

Claim Rejections - 35 USC § 101

- 4.** **Claim(s) 1, 3-4, 8 11 and 14** is/are rejected under 35 U.S.C. § 101 because the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility.

The claimed cDNA compound is not supported by a specific asserted utility because the use of SEQ ID NO: 365 or a fragment thereof is generally applicable to any nucleic acid and therefore is not particular to the nucleic acid being claimed. Further, the claimed cDNA compound is not supported by a substantial utility because the specification only supports the use of the cDNA for making the corresponding protein. In this case the protein set forth in SEQ ID NO: 366. Once the protein is obtained, the protein would be used in research to functionally characterize the protein. A starting material that can only be used to produce a final product does not have a substantial asserted utility in those instances where the final product is not supported by a specific and substantial utility. In the instant case the protein that is to be produced as a final product resulting from processes involving the claimed cDNA does not have an asserted or identified specific and substantial utility. The research contemplated by applicants to characterize the potential protein product, especially their biological activities, does not constitute a specific and substantial utility. Identifying and studying the properties of the protein itself or the mechanisms in which the protein is involved does not define a "real world" context of use. Note, because the claimed invention is not supported by a specific and substantial asserted utility for the reasons set forth above, credibility has not been assessed. Neither the specification as filed nor any art of record discloses or suggests any property or activity for the cDNA compound such that another non-asserted utility would be well established for the compound

35 USC § 112 - 1ST PARAGRAPH

- 5.** The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

CLAIM REJECTIONS under 35 USC § 112- 1ST PARAGRAPH

- 6.** **Claim(s) 1, 3-4, 8,11 and 14** is/are rejected under 35 U.S.C. 112, first paragraph.

Specifically, since the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility for the reason(s) set forth above, one skilled in the art would not know how to use the claimed invention without undue experimentation.

35 USC § 112- 2ND PARAGRAPH

- 7.** The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

CLAIM REJECTIONS under 35 USC § 112- 2ND PARAGRAPH

- 8.** **Claim(s) 1, 3-4, 8, 11 and 14** is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim(s) 1, 3-4, 8, 11 and 14 recite limitations that have been withdrawn from consideration as the result of the restriction/election requirement. Please correct.

Claim(s) 1 is/are indefinite in that in the preamble the claim recites a "polynucleotide comprising" however in section (c) the claim recites "sequences consisting of" These are contradictory in that one (i.e. a "polynucleotide comprising") is open language while the other (i.e. "sequences consisting of") is closed language. As a result the scope of the claimed invention cannot be determined. Please clarify.

35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that may form the basis for rejections set forth in this Office action:

A person shall be entitled to a patent unless --

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (e) The invention was described in --
 - (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
 - (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a)

Claim Rejections under 35 USC § 102

10. Claim(s) 1 is/are rejected under 35 U.S.C. 102(a) as being anticipated by Kikuno et al. (1999).

Claim 1 is drawn to an isolated polynucleotide comprising a sequence selected from a defined group which includes a polynucleotide sequence provided in SEQ ID NO : 365 or the complement of SEQ ID NO: 365 or a sequence that will hybridize to SEQ ID NO: 365 under moderately stringent conditions or a sequence consisting of at least 20 contiguous residues of a sequence provided in SEQ ID NO: 365 or a sequence which has at least 75% identity with SEQ ID NO: 365 or a sequence which has at least 90% identity with SEQ ID NO: 365 or a degenerate variant of SEQ ID NO: 365.

Kikuno et al. teach an isolated polynucleotide comprising (i.e. provided in) SEQ ID NO : 365. See the attached marked Kikuno et al./ SEQ ID NO: 365. Also note the attached marked Emerson et al./ SEQ ID NO: 365. Emerson et al. is not prior art, but it could become prior art if a corresponding US patent issues which claims priority to the US provisional application cited on the front of WO0121640 A1. The sequence taught by Kikuno et al. consists of at least 20 contiguous residues of a sequence provided in SEQ ID NO: 365. Note that because Kikuno et al. teach SEQ ID NO: 365 they necessarily (i.e. inherently) teach the complement of SEQ ID NO: 365 (i.e. a sequence that will hybridize to SEQ ID NO: 365 under moderately stringent conditions)

Also, note that the sequence of Kikuno et al. has a sequence which has at least 75% identity with SEQ ID NO: 365 and has at least 90% identity with SEQ ID NO: 365. Finally, note that Kikuno et al. teach one variant (i.e. degenerate variant) of SEQ ID NO: 365.

11. Claim(s) 1 and 8 is/are rejected under 35 U.S.C. 102(b) as being anticipated by Sommer et al. (1989).

Claim 1 is drawn to an isolated polynucleotide comprising a sequence selected from a defined group which includes a polynucleotide sequence that will hybridize with SEQ ID NO: 365 under moderately stringent conditions.

Claim 8 is drawn to an oligonucleotide that hybridizes to SEQ ID NO: 365 under moderately stringent conditions.

Sommer et al. teach an isolated polynucleotide (i.e. the first oligo listed in Table 1) which will hybridize with SEQ ID NO: 365 under moderately stringent conditions. Admittedly, the oligo taught by Sommer et al. will not hybridize throughout its entire length with SEQ ID NO: 365 but it will hybridize enough to prime amplification under moderately stringent conditions, therefore it meets all of the limitations of Claim 1 part (d) and all of the limitations of Claim 8. See for example, the sequence of SEQ ID NO: 365 at nucleotide 1359-1361 which reads TAG. This is the inverse complement of the 3' end of the first oligo listed in Table 1. Note that Sommer teaches the minimal homology requirements for PCR primers (i.e. 17-20mers need at least 3 complementary nucleotides at their 3' ends for successful priming). One possible way to overcome this rejection is to amend the claim(s) to make it clear that the sequences claimed in Claim 1, step(d), and Claim 8 hybridize throughout their entire lengths to SEQ ID NO: 365.

35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligations under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. § 102(f) or (g) prior art under 35 U.S.C. § 103.

CLAIM REJECTIONS UNDER 35 USC § 103

14. **Claim(s) 14** is/are rejected under 35 U.S.C. 102(b) as being anticipated by Sommer et al. (1989) as applied against Claim 8 above and further in view of the Stratagene Catalog (1988).

Claim 14 is drawn to a kit comprising at least one oligo according to Claim 8.

Sommer et al. teaches an oligo which meets all of the limitations of Claim 8. Sommer et al. does not teach a kit. However, as evidenced by the Stratagene Catalog teaching, it was well known at the time of the invention to place the reagents needed to perform a nucleic acid based assay into a kit format. Therefore, absent an unexpected result, it would have been *prima facie* obvious to the ordinary artisan at the time of the invention to modify the teachings of Sommer et al. with the teachings of the Stratagene Catalog wherein the reagents necessary to perform the method suggested by Sommer et al. are placed into a kit format. The ordinary artisan would have been motivated to make this modification in order to take advantage of the savings and efficiency afforded by kits.

CONCLUSION

15. **Claim(s) 1, 3-4, 8, 11 and 14** is/are rejected and/or objected to for the reason(s) set forth above.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ethan Whisenant, Ph.D. whose telephone number is (703) 308-6567. The examiner can normally be reached Monday-Friday from 8:30AM -5:30PM EST or any time via voice mail. If repeated

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attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, W. Gary Jones, can be reached at (703) 308-1152.

The fax number for this Examiner is (703) 746-8465. Before faxing any papers please inform the examiner to avoid lost papers. Please note that the faxing of papers must conform with the Notice to Comply published in the Official Gazette, 1096 OG 30 (November 15, 1989). Any inquiry of a general nature or relating to the status of this application should be directed to the group receptionist whose telephone number is (703) 308-0196.



Ethan Whisenant, Ph.D.
Primary Examiner

Kikuno et al./SEQ ID NO: 365

RESULT 3
AB029000
LOCUS AB029000 4834 bp mRNA linear PRI 04-AUG-1999
DEFINITION Homo sapiens mRNA for KIAA1077 protein, partial cds.
ACCESSION AB029000
VERSION AB029000.1 GI:5689490
KEYWORDS
SOURCE Homo sapiens brain cDNA to mRNA, clone_lib:pBluescriptII SK plus
clone:hj06803.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (sites)
AUTHORS Kikuno,R., Nagase,T., Ishikawa,K., Hiroshima,M., Miyajima,N.,
Tanaka,A., Kotani,H., Nomura,N. and Ohara,O.
TITLE Prediction of the coding sequences of unidentified human genes.
XIV. The complete sequences of 100 new cDNA clones from brain which
code for large proteins in vitro
JOURNAL DNA Res. 6 (3), 197-205 (1999)
MEDLINE 99397452
REFERENCE 2 (bases 1 to 4834)
AUTHORS Ohara,O., Nagase,T. and Kikuno,R.
TITLE Direct Submission
JOURNAL Submitted (17-JUN-1999) Osamu Ohara, Kazusa DNA Research Institute,
Laboratory of DNA Technology; Yana 1532-3, Kisarazu, Chiba
292-0812, Japan (E-mail:cdnainfo@kazusa.or.jp, Tel:+81-438-52-3913,
Fax:+81-438-52-3914)
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Best Local Similarity 100.0%; Pred. No. 0;
Matches 4834; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Qy	2041	AGGAAGGGGGAAAGAGTCAGCCTGCCTGGCCTCACTTGCTCACGCATGACAACAACCAC	2100
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Qy	2101	TGGCAGACAGCCCCGTTCTGGAACCTGGGATCTTCTGTGCTGCACGAGTTCTAACAAAT	2160
Db	2101	TGGCAGACAGCCCCGTTCTGGAACCTGGGATCTTCTGTGCTGCACGAGTTCTAACAAAT	2160
Qy	2161	AACACCTACTGGTGTGTTGCGTACAGTTAATGAGACGCATAATTCTTCTGTGAGTTT	2220
Db	2161	AACACCTACTGGTGTGTTGCGTACAGTTAATGAGACGCATAATTCTTCTGTGAGTTT	2220
Qy	2221	GCTACTGGCTTTGGAGTATTTGATATGAATACAGATCCTTATCAGCTCACAAATACA	2280
Db	2221	GCTACTGGCTTTGGAGTATTTGATATGAATACAGATCCTTATCAGCTCACAAATACA	2280
Qy	2281	GTGCACACGGTAGAACGAGGCATTTGAATCAGCTACACGTACAACATAATGGAGCTCAGA	2340
Db	2281	GTGCACACGGTAGAACGAGGCATTTGAATCAGCTACACGTACAACATAATGGAGCTCAGA	2340
Qy	2341	AGCTGTCAAGGATATAAGCAGTGCAACCCAAGACCTAACAGAAATCTTGATGTTGAAATAAA	2400
Db	2341	AGCTGTCAAGGATATAAGCAGTGCAACCCAAGACCTAACAGAAATCTTGATGTTGAAATAAA	2400
Qy	2401	GATGGAGGAAGCTATGACCTACACAGAGGACAGTTATGGGATGGATGGAGGTAAATCA	2460
Db	2401	GATGGAGGAAGCTATGACCTACACAGAGGACAGTTATGGGATGGATGGAGGTAAATCA	2460
Qy	2461	GCCCCGTCTCACTGCAGACATCAACTGGCAAGGCCTAGAGGAGCTACACAGTGTGAATGA	2520
Db	2461	GCCCCGTCTCACTGCAGACATCAACTGGCAAGGCCTAGAGGAGCTACACAGTGTGAATGA	2520
Qy	2521	AAACATCTATGAGTACAGACAAAACATACAGACTTAGTCTGGTGGACTGGACTAATTACTT	2580
Db	2521	AAACATCTATGAGTACAGACAAAACATACAGACTTAGTCTGGTGGACTGGACTAATTACTT	2580
Qy	2581	GAAGGATTTAGATAGAGTATTGCACTGCTGAAGAGTCACATGAGCAAAATAAAACAAA	2640
Db	2581	GAAGGATTTAGATAGAGTATTGCACTGCTGAAGAGTCACATGAGCAAAATAAAACAAA	2640

Qy	2641	TAAGACTCAAACGTCAAAAGTGACGGTTCTGGTGTCTGCTGAGCACGCTGTGTC	2700
Db	2641	TAAGACTCAAACGTCAAAAGTGACGGTTCTGGTGTCTGCTGAGCACGCTGTGTC	2700
Qy	2701	AATGGAGATGCCCTGTGACTCAGATGAAGACCCAAGGCATAAGGGAAAACACC	2760
Db	2701	AATGGAGATGCCCTGTGACTCAGATGAAGACCCAAGGCATAAGGGAAAACACC	2760
Qy	2761	TCATTGACCTGCCAGCTGACCTCAAACCCCTGCATTGAACCGACCAACATTAAGTCC	2820
Db	2761	TCATTGACCTGCCAGCTGACCTCAAACCCCTGCATTGAACCGACCAACATTAAGTCC	2820
Qy	2821	AGAGAGTAAACTGAATGGAATAACGACATTCCAGAAGTTAACATTGAATTCTGAACA	2880
Db	2821	AGAGAGTAAACTGAATGGAATAACGACATTCCAGAAGTTAACATTGAATTCTGAACA	2880
Qy	2881	CTGGAGAAAAACGAAAATGGACGGGCATGAAGAGACTAACATCTGGAAACCGATT	2940
Db	2881	CTGGAGAAAAACGAAAATGGACGGGCATGAAGAGACTAACATCTGGAAACCGATT	2940
Qy	2941	CAGTGGCGATGGCATGACAGAGCTAGAGCTGGGCCAGCCCCAGGCTGCAGCCCATTG	3000
Db	2941	CAGTGGCGATGGCATGACAGAGCTAGAGCTGGGCCAGCCCCAGGCTGCAGCCCATTG	3000
Qy	3001	CAGGCACCCGAAAGAACATTCCCCAGTATGGTGGTCTGGAAAGGACATTTGAAGATCA	3060
Db	3001	CAGGCACCCGAAAGAACATTCCCCAGTATGGTGGTCTGGAAAGGACATTTGAAGATCA	3060
Qy	3061	ACTATATCTTCTGTGCATTCCGATGGAATTTCAGTTCATCAGATGTTACCATGGCCAC	3120
Db	3061	ACTATATCTTCTGTGCATTCCGATGGAATTTCAGTTCATCAGATGTTACCATGGCCAC	3120
Qy	3121	CGCAGAACACCGAAGTAATTCCAGCATAGGGAAAGATGTTGACCAAGGTGGAGAAGAA	3180
Db	3121	CGCAGAACACCGAAGTAATTCCAGCATAGGGAAAGATGTTGACCAAGGTGGAGAAGAA	3180
Qy	3181	TCACGAAAAGGAGAAGTCACAGCACCTAGAAGGCAGCGCCTCTTCACTCTCTGA	3240
Db	3181	TCACGAAAAGGAGAAGTCACAGCACCTAGAAGGCAGCGCCTCTTCACTCTCTGA	3240
Qy	3241	TTAGATGAAACTGTTACCTTACCTAAACACAGTATTCTTTAACCTTTTATTGTA	3300
Db	3241	TTAGATGAAACTGTTACCTTACCTAAACACAGTATTCTTTAACCTTTTATTGTA	3300
Qy	3301	AACTAATAAAGGTAATCACAGCCACCAACATTCAAGCTACCCGGTACCTTGCGAG	3360
Db	3301	AACTAATAAAGGTAATCACAGCCACCAACATTCAAGCTACCCGGTACCTTGCGAG	3360
Qy	3361	TAGAAGCTAGTGAGCATGTGAGCAAGCGGTGTGCACACGGAGACTCATCGTTATAATT	3420
Db	3361	TAGAAGCTAGTGAGCATGTGAGCAAGCGGTGTGCACACGGAGACTCATCGTTATAATT	3420
Qy	3421	CTATCTGCCAAGAGTAGAAAGAAAGGCTGGGATATTGGGTTGGCTGGTTGATT	3480
Db	3421	CTATCTGCCAAGAGTAGAAAGAAAGGCTGGGATATTGGGTTGGCTGGTTGATT	3480
Qy	3481	TTGCTTGTGTTGTTGTACTAAACAGTATTATCTTTGAATATCGTAGGGACATA	3540
Db	3481	TTGCTTGTGTTGTTGTACTAAACAGTATTATCTTTGAATATCGTAGGGACATA	3540

Qy 3541 AGTATATACTGTTATCCAATCAAGATGGCTAGAATGGGCCTTCTGAGTGTCTAAAC 3600
|||
Db 3541 AGTATATACTGTTATCCAATCAAGATGGCTAGAATGGGCCTTCTGAGTGTCTAAAC 3600

Qy 3601 TTGACACCCCTGGTAAATCTTCACACACTTCCACTGCCCTCGCTAATGAAGTTTGATT 3660
|||
Db 3601 TTGACACCCCTGGTAAATCTTCACACACTTCCACTGCCCTCGCTAATGAAGTTTGATT 3660

Qy 3661 CATTCTAACCACTGGAATTTCATGCCGTCTTCAGTTAGATGATTTGCACTTT 3720
|||
Db 3661 CATTCTAACCACTGGAATTTCATGCCGTCTTCAGTTAGATGATTTGCACTTT 3720

Qy 3721 GAGATTAAAATGCCATGTCTATTGATTAGTCTTATTTTTATTTTACAGGCTTATCA 3780
|||
Db 3721 GAGATTAAAATGCCATGTCTATTGATTAGTCTTATTTTTATTTTACAGGCTTATCA 3780

Qy 3781 GTCTCACTGTTGGCTGTCTTGTGACAAAGTCAAATAACCCCCAAGGACGACACAGT 3840
|||
Db 3781 GTCTCACTGTTGGCTGTCTTGTGACAAAGTCAAATAACCCCCAAGGACGACACAGT 3840

Qy 3841 ATGGATCACATATTGTTGACATTAAGCTTTGCCAGAAAATGTTGCATGTGTTTACCT 3900
|||
Db 3841 ATGGATCACATATTGTTGACATTAAGCTTTGCCAGAAAATGTTGCATGTGTTTACCT 3900

Qy 3901 CGACTTGCTAAATCGATTAGCAGAAAGGCATGGCTAATAATGTTGGTGGTGAAGAAAAAA 3960
|||
Db 3901 CGACTTGCTAAATCGATTAGCAGAAAGGCATGGCTAATAATGTTGGTGGTGAAGAAAAAA 3960

Qy 3961 TAAATAAGTAAACAAAATGAAGATTGCCCTGCTCTCTGTGCCCTAGCCTCAAAGCGTTCA 4020
|||
Db 3961 TAAATAAGTAAACAAAATGAAGATTGCCCTGCTCTCTGTGCCCTAGCCTCAAAGCGTTCA 4020

Qy 4021 TCATACATCATACCTTAAGATTGCTATATTTGGGTTATTTCTTGACAGGAGAAAAAG 4080
|||
Db 4021 TCATACATCATACCTTAAGATTGCTATATTTGGGTTATTTCTTGACAGGAGAAAAAG 4080

Qy 4081 ATCTAAAGATCTTTATTTCATCTTTGGTTCTGGCATGACTAAGAAGCTTAA 4140
|||
Db 4081 ATCTAAAGATCTTTATTTCATCTTTGGTTCTGGCATGACTAAGAAGCTTAA 4140

Qy 4141 TGTTGATAAAATATGACTAGTTGAAATTACACCAAGAACCTCTCAATAAAAGAAAATC 4200
|||
Db 4141 TGTTGATAAAATATGACTAGTTGAAATTACACCAAGAACCTCTCAATAAAAGAAAATC 4200

Qy 4201 ATGAATGCTCCACAATTCAACATACCAAGAGAAGTTAAATTCTTAACATTGTTCT 4260
|||
Db 4201 ATGAATGCTCCACAATTCAACATACCAAGAGAAGTTAAATTCTTAACATTGTTCT 4260

Qy 4261 ATGATTATTTGTAAGACCTTCACCAAGTTCTGATATCTTTAAAGACATAGTTCAAAATT 4320
|||
Db 4261 ATGATTATTTGTAAGACCTTCACCAAGTTCTGATATCTTTAAAGACATAGTTCAAAATT 4320

Qy 4321 GCTTTGAAAATCTGATTCTGAAAATACCTTGTGTTGATTAGGTTTAAATACCA 4380
|||
Db 4321 GCTTTGAAAATCTGATTCTGAAAATACCTTGTGTTGATTAGGTTTAAATACCA 4380

Qy 4381 GCTAAAGGATTACCTCACTGAGTCATCAGTACCCCTATTCAAGCTCCCCAAGATGATGT 4440
|||
Db 4381 GCTAAAGGATTACCTCACTGAGTCATCAGTACCCCTATTCAAGCTCCCCAAGATGATGT 4440

Qy 4441 GTTTTGCTTACCCCTAACAGAGGTTTCTTCTTATTTTAGATAATTCAAGTGCTTAGAT 4500
||| |||
Db 4441 GTTTTGCTTACCCCTAACAGAGGTTTCTTCTTATTTTAGATAATTCAAGTGCTTAGAT 4500

Qy 4501 AAATTATGTTTCTTAAGTGTATGGTAAACTCTTTAAAGAAAATTTAATATGTTAT 4560
||| |||
Db 4501 AAATTATGTTTCTTAAGTGTATGGTAAACTCTTTAAAGAAAATTTAATATGTTAT 4560

Qy 4561 AGCTGAATCTTTGGTAACCTTAAATCTTATCATAGACTCTGTACATATGTTCAAATT 4620
||| |||
Db 4561 AGCTGAATCTTTGGTAACCTTAAATCTTATCATAGACTCTGTACATATGTTCAAATT 4620

Qy 4621 AGCTGCTTGCCTGATGTGTATCATCGGTGGGATGACAGAACAAACATATTTATGATCA 4680
||| |||
Db 4621 AGCTGCTTGCCTGATGTGTATCATCGGTGGGATGACAGAACAAACATATTTATGATCA 4680

Qy 4681 TGAATAATGTGCTTGTAAAAAGATTCAAGTTATTAGGAAGCATACTCTGTTTTAAT 4740
||| |||
Db 4681 TGAATAATGTGCTTGTAAAAAGATTCAAGTTATTAGGAAGCATACTCTGTTTTAAT 4740

Qy 4741 CATGTATAATATTCCATGATACTTTATAGAACAAATTCTGGCTTCAGGAAAGTCTAGAAG 4800
||| |||
Db 4741 CATGTATAATATTCCATGATACTTTATAGAACAAATTCTGGCTTCAGGAAAGTCTAGAAG 4800

Qy 4801 CAATATTCTTCAAATAAAAGGTGTTAAACTTT 4834
||| |||
Db 4801 CAATATTCTTCAAATAAAAGGTGTTAAACTTT 4834

Emerson et al./ SEQ ID NO: 365

RESULT 2

AAD03774

ID AAD03774 standard; cDNA; 4834 BP.

XX

AC AAD03774;

XX

DT 19-JUN-2001 (first entry)

XX

DE Human sulfatase (HSulf-1) AB029000 cDNA.

XX

KW Human; sulfatase; Sulf-1; Sulf-2; cytostatic; virucide; antiinflammatory;
KW degenerative disease; neural; renal; skeletal muscle; viral infection;
KW metastasis; inflammation; cancer; EST; Expressed Sequence Tag; therapy;
KW ss.

XX

OS Homo sapiens.

XX

FH Key Location/Qualifiers

FT CDS 1..4833

FT /*tag= a
FT /product= "Human sulfatase (HSulf-1)"
FT /transl_except= (pos:2455..2457, aa:Xaa)
FT /transl_except= (pos:2518..2520, aa:Xaa)
FT /transl_except= (pos:2530..2532, aa:Xaa)
FT /transl_except= (pos:2554..2556, aa:Xaa)
FT /transl_except= (pos:2572..2574, aa:Xaa)
FT /transl_except= (pos:2593..2595, aa:Xaa)
FT /transl_except= (pos:2623..2625, aa:Xaa)
FT /transl_except= (pos:2632..2634, aa:Xaa)
FT /transl_except= (pos:2641..2643, aa:Xaa)
FT /transl_except= (pos:2662..2664, aa:Xaa)
FT /transl_except= (pos:2686..2688, aa:Xaa)
FT /transl_except= (pos:2719..2721, aa:Xaa)
FT /transl_except= (pos:2728..2730, aa:Xaa)
FT /transl_except= (pos:2743..2745, aa:Xaa)
FT /transl_except= (pos:2779..2781, aa:Xaa)
FT /transl_except= (pos:2827..2829, aa:Xaa)
FT /transl_except= (pos:2833..2835, aa:Xaa)
FT /transl_except= (pos:2842..2844, aa:Xaa)
FT /transl_except= (pos:2860..2862, aa:Xaa)
FT /transl_except= (pos:2875..2877, aa:Xaa)
FT /transl_except= (pos:2911..2913, aa:Xaa)
FT /transl_except= (pos:2920..2922, aa:Xaa)
FT /transl_except= (pos:3052..3054, aa:Xaa)
FT /transl_except= (pos:3136..3138, aa:Xaa)
FT /transl_except= (pos:3238..3240, aa:Xaa)
FT /transl_except= (pos:3265..3267, aa:Xaa)
FT /transl_except= (pos:3304..3306, aa:Xaa)
FT /transl_except= (pos:3307..3309, aa:Xaa)
FT /transl_except= (pos:3313..3315, aa:Xaa)
FT /transl_except= (pos:3361..3363, aa:Xaa)
FT /transl_except= (pos:3379..3381, aa:Xaa)
FT /transl_except= (pos:3571..3573, aa:Xaa)
FT /transl_except= (pos:3595..3597, aa:Xaa)
FT /transl_except= (pos:3667..3669, aa:Xaa)
FT /transl_except= (pos:3703..3705, aa:Xaa)
FT /transl_except= (pos:3748..3750, aa:Xaa)
FT /transl_except= (pos:3919..3921, aa:Xaa)
FT /transl_except= (pos:3961..3963, aa:Xaa)

FT /transl_except= (pos:4066..4068, aa:Xaa)
FT /transl_except= (pos:4084..4086, aa:Xaa)
FT /transl_except= (pos:4144..4146, aa:Xaa)
FT /transl_except= (pos:4147..4149, aa:Xaa)
FT /transl_except= (pos:4189..4191, aa:Xaa)
FT /transl_except= (pos:4291..4293, aa:Xaa)
FT /transl_except= (pos:4309..4311, aa:Xaa)
FT /transl_except= (pos:4342..4344, aa:Xaa)
FT /transl_except= (pos:4372..4374, aa:Xaa)
FT /transl_except= (pos:4399..4401, aa:Xaa)
FT /transl_except= (pos:4435..4437, aa:Xaa)
FT /transl_except= (pos:4483..4485, aa:Xaa)
FT /transl_except= (pos:4516..4518, aa:Xaa)
FT /transl_except= (pos:4564..4566, aa:Xaa)
FT /transl_except= (pos:4675..4677, aa:Xaa)
FT /transl_except= (pos:4681..4683, aa:Xaa)
FT /transl_except= (pos:4647..4749, aa:Xaa)
FT /transl_except= (pos:4768..4770, aa:Xaa)
FT /transl_except= (pos:4795..4797, aa:Xaa)
FT /transl_except= (pos:4816..4818, aa:Xaa)
FT /note= "Xaa corresponds to inframe stop codon; CDS
FT does not include start and stop codons"
FT /partial

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PN WO200121640-A1.

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PD 29-MAR-2001.

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PF 22-SEP-2000; 2000WO-US26124.

XX

PR 23-SEP-1999; 99US-0155738.

XX

PA (UYPE-) UNIV PENNSYLVANIA.

PA (ROYA-) ROYAL VETERINARY COLLEGE.

XX

PI Emerson CP, Dhoot GK;

XX

DR WPI; 2001-266062/27.

DR P-PSDB; AAE00438.

XX

PT Novel Sulf-1 or Sulf-2 (members of subfamily of sulfatases) polypeptide
PT useful for treating musculoskeletal, neural or renal degenerative
PT disorder, and for inhibiting viral infection of cells -

XX

PS Claim 2; Page 40-42; 59pp; English.

XX

CC The present cDNA sequence encodes human sulfatase (HSulf-1) which is
CC obtained from EST (Expressed Sequence Tag) AB029000.
CC The invention relates to Sulf-1 and Sulf-2 proteins and their
CC corresponding cDNA molecules which are the members of subfamily of
CC sulfatases. These sulfatase proteins are expressed in neural and muscle
CC lineages in various species. Sulfatase proteins are useful for modifying
CC growth properties of cells, preferably cancer cells, useful in the
CC treatment of cancer and in the inhibition of metastases. Sulf-1 and
CC Sulf-2 are useful in developing cells for transplant in the treatment of
CC skeletomuscular degenerative diseases, neurodegenerative diseases, renal
CC degenerative diseases and in initiation growth of healthy cells and to
CC heal diseased cells in these disorders. Sulfatases are also useful for
CC inhibiting infection of cells by viruses which utilise sulfated heparin
CC proteoglycans for entry into cells, and for modulating recruitment of
CC lymphocytes by cells to sites of inflammation. A functional embryonic

CC technique is useful to functionally characterise members of Sulf-1 and
CC Sulf-2 sulfatase gene subfamily, which is efficient and economical.

XX

SQ Sequence 4834 BP; 1498 A; 992 C; 1042 G; 1302 T; 0 other;

Query Match 100.0%; Score 4834; DB 22; Length 4834;
Best Local Similarity 100.0%; Pred. No. 0;
Matches 4834; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

QY 1 GATGTGGAGCTGGGTCCCTGCAAGTCATGAACAAAACGAGAAAGATTATGGAACATGGG 60

Db 1 GATGTGGAGCTGGGTCCCTGCAAGTCATGAACAAAACGAGAAAGATTATGGAACATGGG 60

QY 61 GGGGCCACCTTCATCAATGCCTTGTGACTACACCCATGTGCTGCCGTACGGTCCTCC 120

Db 61 GGGGCCACCTTCATCAATGCCTTGTGACTACACCCATGTGCTGCCGTACGGTCCTCC 120

QY 121 ATGCTCACCGGGAAAGTATGTGACAATCACAATGTCTACACCAACAACGAGAACTGCTCT 180

Db 121 ATGCTCACCGGGAAAGTATGTGACAATCACAATGTCTACACCAACAACGAGAACTGCTCT 180

QY 181 TCCCCCTCGTGGCAGGCCATGCATGAGCCTCGGACTTTGCTGTATATCTAACAAACACT 240

Db 181 TCCCCCTCGTGGCAGGCCATGCATGAGCCTCGGACTTTGCTGTATATCTAACAAACACT 240

QY 241 GGCTACAGAACAGCCTTTTGAAAATACCTCAATGAATATAATGGCAGCTACATCCCC 300

Db 241 GGCTACAGAACAGCCTTTTGAAAATACCTCAATGAATATAATGGCAGCTACATCCCC 300

QY 301 CCTGGGTGGCGAGAATGGCTTGGATTAAATCAAGAATTCTCGTTCTATAATTACACTGTT 360

Db 301 CCTGGGTGGCGAGAATGGCTTGGATTAAATCAAGAATTCTCGTTCTATAATTACACTGTT 360

QY 361 TGTCGAATGGCATCAAAGAAAAGCATGGATTGATTATGCAAAGGACTACTTCACAGAC 420

Db 361 TGTCGAATGGCATCAAAGAAAAGCATGGATTGATTATGCAAAGGACTACTTCACAGAC 420

QY 421 TTAATCACTAACGAGAGCATTAAATTACTTCAAAATGTCTAACAGAACATGTATCCCCATAGG 480

Db 421 TTAATCACTAACGAGAGCATTAAATTACTTCAAAATGTCTAACAGAACATGTATCCCCATAGG 480

QY 481 CCCGTTATGATGGTATCAGCCACGCTGCGCCCCACGGCCCCGAGGACTCAGCCCCACAG 540

Db 481 CCCGTTATGATGGTATCAGCCACGCTGCGCCCCACGGCCCCGAGGACTCAGCCCCACAG 540

QY 541 TTTCTAAACTGTACCCCAATGCTTCCAACACATAACTCCTAGTTATAACTATGCACCA 600

Db 541 TTTCTAAACTGTACCCCAATGCTTCCAACACATAACTCCTAGTTATAACTATGCACCA 600

QY 601 AATATGGATAAACACTGGATTATGCAGTACACAGGACCAATGCTGCCCATCCACATGGAA 660

Db 601 AATATGGATAAACACTGGATTATGCAGTACACAGGACCAATGCTGCCCATCCACATGGAA 660

QY 661 TTTACAAACATTCTACAGCGAAAAGGCTCCAGACTTGTGATGTCAGTGGATGATTCTGTG 720

Db 661 TTTACAAACATTCTACAGCGAAAAGGCTCCAGACTTGTGATGTCAGTGGATGATTCTGTG 720

QY 721 GAGAGGCTGTATAACATGCTCGTGGAGACGGGGAGCTGGAGAACACTTACATCATTAC 780

Db 721 GAGAGGCTGTATAACATGCTCGTGGAGACGGGGAGCTGGAGAACACTTACATCATTAC 780

Qy	781	ACCGCCGACCATGGTTACCATATTGGGCAGTTGGACTGGTCAAGGGAAATCCATGCCA	840
Db	781	ACCGCCGACCATGGTTACCATATTGGGCAGTTGGACTGGTCAAGGGAAATCCATGCCA	840
Qy	841	TATGACTTTGATATCGTGTGCCCTTTTTATTCTGGTCAAGTGTAGAACCCAGGATCA	900
Db	841	TATGACTTTGATATCGTGTGCCCTTTTTATTCTGGTCAAGTGTAGAACCCAGGATCA	900
Qy	901	ATAGTCCCACAGATCGTCTAACATTGACTTGCCCCACGATCCTGGATATTGCTGGG	960
Db	901	ATAGTCCCACAGATCGTCTAACATTGACTTGCCCCACGATCCTGGATATTGCTGGG	960
Qy	961	CTCGACACACCTCCTGATGTGGACGGCAAGTCTGTCCCAAACCTCTGGACCCAGAAAAG	1020
Db	961	CTCGACACACCTCCTGATGTGGACGGCAAGTCTGTCCCAAACCTCTGGACCCAGAAAAG	1020
Qy	1021	CCAGGTAACAGGTTTCGAACAAACAAGAAGGCCAAATTGGCGTGTACATTCCCTAGTG	1080
Db	1021	CCAGGTAACAGGTTTCGAACAAACAAGAAGGCCAAATTGGCGTGTACATTCCCTAGTG	1080
Qy	1081	GAAAGAGGCAAATTCTACGTAAGAAGGAAGAACAGTCAAAT	1140
Db	1081	GAAAGAGGCAAATTCTACGTAAGAAGGAAGAACAGTCAAAT	1140
Qy	1141	CACTTGCCCAAATATGAACGGGTCAAAGAAACTATGCCAGCAGGCCAGGTACACAGGCC	1200
Db	1141	CACTTGCCCAAATATGAACGGGTCAAAGAAACTATGCCAGCAGGCCAGGTACACAGGCC	1200
Qy	1201	TGTGAACAACCGGGGCAGAAGTGGCAATGCATTGAGGATAACATCTGGCAAGCTTCGAATT	1260
Db	1201	TGTGAACAACCGGGGCAGAAGTGGCAATGCATTGAGGATAACATCTGGCAAGCTTCGAATT	1260
Qy	1261	CACAAGTGTAAAGGACCCAGTGACCTGCTCACAGTCCGGCAGAGCACGCCAACCTCTAC	1320
Db	1261	CACAAGTGTAAAGGACCCAGTGACCTGCTCACAGTCCGGCAGAGCACGCCAACCTCTAC	1320
Qy	1321	GCTCGCGGCTTCCATGACAAGAACAAAGAGTCAGTTGTAGGGAGTCTGGTTACCGTGCC	1380
Db	1321	GCTCGCGGCTTCCATGACAAGAACAAAGAGTCAGTTGTAGGGAGTCTGGTTACCGTGCC	1380
Qy	1381	AGCAGAAGCCAAAGAAAGACTAACGGCAATTCTTGAGAAACCAGGGGACTCCAAAGTAC	1440
Db	1381	AGCAGAAGCCAAAGAAAGACTAACGGCAATTCTTGAGAAACCAGGGGACTCCAAAGTAC	1440
Qy	1441	AAGCCCAGATTGTCCATACTCGGCAGACACGTTCTTGTCCGTCAATTGAAGGTGAA	1500
Db	1441	AAGCCCAGATTGTCCATACTCGGCAGACACGTTCTTGTCCGTCAATTGAAGGTGAA	1500
Qy	1501	ATATATGACATAAAATCTGGAAGAAGAAGAAGAATTGCAAGTGTGCAACCAAGAAACATT	1560
Db	1501	ATATATGACATAAAATCTGGAAGAAGAAGAAGAATTGCAAGTGTGCAACCAAGAAACATT	1560
Qy	1561	GCTAACCGTCATGATGAAGGCCACAAGGGGCAAGAGAGATCTCCAGGCTTCCAGTGGTGGC	1620
Db	1561	GCTAACCGTCATGATGAAGGCCACAAGGGGCAAGAGAGATCTCCAGGCTTCCAGTGGTGGC	1620
Qy	1621	AACAGGGCAGGATGCTGGCAGATAGCAGCAACGCCGTGGGCCACCTACCACTGTCCGA	1680
Db	1621	AACAGGGCAGGATGCTGGCAGATAGCAGCAACGCCGTGGGCCACCTACCACTGTCCGA	1680

Qy	1681	GTGACACACAAGTTTATTCTTCCAAATGACTCTATCCATTGTGAGAGAGAACTGTAC	1740
Db	1681	GTGACACACAAGTTTATTCTTCCAAATGACTCTATCCATTGTGAGAGAGAACTGTAC	1740
Qy	1741	CAATCGGCCAGAGCGTGGAAAGGACCATAAGGCATACATTGACAAAGAGATTGAAGCTCTG	1800
Db	1741	CAATCGGCCAGAGCGTGGAAAGGACCATAAGGCATACATTGACAAAGAGATTGAAGCTCTG	1800
Qy	1801	CAAGATAAAATTAAAGAATTAAAGAGAAGTGGAGAGGACATCTGAAGAGAAGGAAGCCTGAG	1860
Db	1801	CAAGATAAAATTAAAGAATTAAAGAGAAGTGGAGAGGACATCTGAAGAGAAGGAAGCCTGAG	1860
Qy	1861	GAATGTAGCTGCAGTAAACAAAGCTATTACAATAAAAGAGAAAGGTGTAAAAAGCAAGAG	1920
Db	1861	GAATGTAGCTGCAGTAAACAAAGCTATTACAATAAAAGAGAAAGGTGTAAAAAGCAAGAG	1920
Qy	1921	AAATTAAAGAGCCATCTCACCCATTCAAGGAGGCTGCTCAGGAAGTAGATAGCAAAC TG	1980
Db	1921	AAATTAAAGAGCCATCTCACCCATTCAAGGAGGCTGCTCAGGAAGTAGATAGCAAAC TG	1980
Qy	1981	CAACTTTCAAGGAGAACACCGTAGGAGGAAGAAGGGAGAGGAAGGAGAACGGCAG	2040
Db	1981	CAACTTTCAAGGAGAACACCGTAGGAGGAAGAAGGGAGAGGAAGGAGAACGGCAG	2040
Qy	2041	AGGAAGGGGAAAGAGTCAGCCTGCCTGGCCTCACTTGCTTCACGCATGACAACAAAC CAC	2100
Db	2041	AGGAAGGGGAAAGAGTCAGCCTGCCTGGCCTCACTTGCTTCACGCATGACAACAAAC CAC	2100
Qy	2101	TGGCAGACAGCCCCGTTCTGGAACCTGGATCTTCTGTGCTTCAGGAGTTCTAACAA AT	2160
Db	2101	TGGCAGACAGCCCCGTTCTGGAACCTGGATCTTCTGTGCTTCAGGAGTTCTAACAA AT	2160
Qy	2161	AACACCTACTGGTGTTCGCGTACAGTTAATGAGACGCATAATTCTTTCTGTGAGTT	2220
Db	2161	AACACCTACTGGTGTTCGCGTACAGTTAATGAGACGCATAATTCTTTCTGTGAGTT	2220
Qy	2221	GCTACTGGCTTTGGAGTATTTGATATGAATAACAGATCCTATCAGCTACAAATACA	2280
Db	2221	GCTACTGGCTTTGGAGTATTTGATATGAATAACAGATCCTATCAGCTACAAATACA	2280
Qy	2281	GTGCACACGGTAGAACGAGGCATTTGAATCAGCTACACGTACAACATAATGGAGCTCAG A	2340
Db	2281	GTGCACACGGTAGAACGAGGCATTTGAATCAGCTACACGTACAACATAATGGAGCTCAG A	2340
Qy	2341	AGCTGTCAAGGATATAAGCAGTGCACCCAAAGACCTAACAGAATCTGATGTTGGAAATA AA	2400
Db	2341	AGCTGTCAAGGATATAAGCAGTGCACCCAAAGACCTAACAGAATCTGATGTTGGAAATA AA	2400
Qy	2401	GATGGAGGAAGCTATGACCTACACAGAGGACAGTTATGGATGGATGGAAAGGTTAATCA	2460
Db	2401	GATGGAGGAAGCTATGACCTACACAGAGGACAGTTATGGATGGATGGAAAGGTTAATCA	2460
Qy	2461	GCCCCGTCTCACTGCAGACATCAACTGGCAAGGCCTAGAGGAGCTACACAGTGTGAATGA	2520
Db	2461	GCCCCGTCTCACTGCAGACATCAACTGGCAAGGCCTAGAGGAGCTACACAGTGTGAATGA	2520
Qy	2521	AAACATCTATGAGTACAGACAAAACATACAGACTTAGTCTGGTGGACTGGACTAAATTACT T	2580
Db	2521	AAACATCTATGAGTACAGACAAAACATACAGACTTAGTCTGGTGGACTGGACTAAATTACT T	2580

Qy	2581	GAAGGATTTAGATAGAGTATTGCACTGCTGAAGAGTCACTATGAGCAAATAAAACAAA	2640
Db	2581	GAAGGATTTAGATAGAGTATTGCACTGCTGAAGAGTCACTATGAGCAAATAAAACAAA	2640
Qy	2641	TAAGACTCAAACGTCAAAGTGACGGTTCTGGTTGCTCTGCTGAGCACGCTGTGTC	2700
Db	2641	TAAGACTCAAACGTCAAAGTGACGGTTCTGGTTGCTCTGCTGAGCACGCTGTGTC	2700
Qy	2701	AATGGAGATGGCCTCTGCTGACTCAGATGAAGACCCAAGGCATAAGGTGGAAAACACC	2760
Db	2701	AATGGAGATGGCCTCTGCTGACTCAGATGAAGACCCAAGGCATAAGGTGGAAAACACC	2760
Qy	2761	TCATTGACCTGCCAGCTGACCTTCAAACCCCTGCATTGAACCGACCAACATTAAGTCC	2820
Db	2761	TCATTGACCTGCCAGCTGACCTTCAAACCCCTGCATTGAACCGACCAACATTAAGTCC	2820
Qy	2821	AGAGAGTAAACTGAATGAAATAACGACATTCCAGAAGTTAACATTGAATTCTGAACA	2880
Db	2821	AGAGAGTAAACTGAATGAAATAACGACATTCCAGAAGTTAACATTGAATTCTGAACA	2880
Qy	2881	CTGGAGAAAACGAAAATGGACGGGCATGAAGAGACTAACATCTGGAAACCGATT	2940
Db	2881	CTGGAGAAAACGAAAATGGACGGGCATGAAGAGACTAACATCTGGAAACCGATT	2940
Qy	2941	CAGTGGCGATGGCATGACAGAGCTAGAGCTGGGCCAGCCCAGGCTGCAGCCCATTG	3000
Db	2941	CAGTGGCGATGGCATGACAGAGCTAGAGCTGGGCCAGCCCAGGCTGCAGCCCATTG	3000
Qy	3001	CAGGCACCGAAAGAACTTCCCAGTATGGTGGCCTGGAAAGGACATTGAAAGATCA	3060
Db	3001	CAGGCACCGAAAGAACTTCCCAGTATGGTGGCCTGGAAAGGACATTGAAAGATCA	3060
Qy	3061	ACTATATCTCCTGTGCATTGGATGAAATTTCAGTCATCAGATGTTACCATGCCAC	3120
Db	3061	ACTATATCTCCTGTGCATTGGATGAAATTTCAGTCATCAGATGTTACCATGCCAC	3120
Qy	3121	CGCAGAACACCGAAGTAATTCCAGCATAGCGGGAAAGATGTTGACCAAGGTGGAGAAGAA	3180
Db	3121	CGCAGAACACCGAAGTAATTCCAGCATAGCGGGAAAGATGTTGACCAAGGTGGAGAAGAA	3180
Qy	3181	TCACGAAAAGGAGAAGTCACAGCACCTAGAAGGCAGCGCCTCTTCACTCTCCTCTGA	3240
Db	3181	TCACGAAAAGGAGAAGTCACAGCACCTAGAAGGCAGCGCCTCTTCACTCTCCTCTGA	3240
Qy	3241	TTAGATGAAACTGTTACCTTACCTAAACACAGTATTCTTTAACCTTTTATTGTA	3300
Db	3241	TTAGATGAAACTGTTACCTTACCTAAACACAGTATTCTTTAACCTTTTATTGTA	3300
Qy	3301	AACTAATAAGGTAATCACAGCCACCAACATTCCAAGCTACCCCTGGTACCTTGCGAG	3360
Db	3301	AACTAATAAGGTAATCACAGCCACCAACATTCCAAGCTACCCCTGGTACCTTGCGAG	3360
Qy	3361	TAGAAGCTAGTGAGCATGTGAGCAAGCGGTGTGCACACGGAGACTCATCGTTATAATT	3420
Db	3361	TAGAAGCTAGTGAGCATGTGAGCAAGCGGTGTGCACACGGAGACTCATCGTTATAATT	3420
Qy	3421	CTATCTGCCAAGAGTAGAAAGAAAGGCTGGGATATTGGGTTGGCTGGTTTGATT	3480
Db	3421	CTATCTGCCAAGAGTAGAAAGAAAGGCTGGGATATTGGGTTGGCTGGTTTGATT	3480

Qy 3481 TTGCTTGTGGTTGTTGTTGACTAAAACAGTATTATCTTTGAATATCGTAGGGACATA 3540
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Db 3481 TTGCTTGTGGTTGTTGTTGACTAAAACAGTATTATCTTTGAATATCGTAGGGACATA 3540

Qy 3541 AGTATATACATGTTATCCAATCAAGATGGCTAGAATGGGCCTTCTGAGTGTCTAAAC 3600
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Db 3541 AGTATATACATGTTATCCAATCAAGATGGCTAGAATGGGCCTTCTGAGTGTCTAAAC 3600

Qy 3601 TTGACACCCCTGGTAAATCTTCAACACACTTCACTGCCCTGCGTAATGAAGTTTGATT 3660
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Db 3601 TTGACACCCCTGGTAAATCTTCAACACACTTCACTGCCCTGCGTAATGAAGTTTGATT 3660

Qy 3661 CATTAAACCAGGAAATTTCATGCCGTCAATTTCAGTTAGATGATTTCGACTTT 3720
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Db 3661 CATTAAACCAGGAAATTTCATGCCGTCAATTTCAGTTAGATGATTTCGACTTT 3720

Qy 3721 GAGATTAATGCCATGTCTATTGATTAGTCTTATTTTATTTTACAGGCTTATCA 3780
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Db 3721 GAGATTAATGCCATGTCTATTGATTAGTCTTATTTTATTTTACAGGCTTATCA 3780

Qy 3781 GTCTCACTGTTGGCTGTCAATTGACAAAGTCAAATAACCCCCAAGGACGACACAGT 3840
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Db 3781 GTCTCACTGTTGGCTGTCAATTGACAAAGTCAAATAACCCCCAAGGACGACACAGT 3840

Qy 3841 ATGGATCACATATTGTTGACATTAAGCTTTGCCAGAAATGTTGCATGTGTTTACCT 3900
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Db 3841 ATGGATCACATATTGTTGACATTAAGCTTTGCCAGAAATGTTGCATGTGTTTACCT 3900

Qy 3901 CGACTTGCTAAATCGATTAGCAGAAAGGCATGGCTAAATAATGTTGGTGGTAAAAAA 3960
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Db 3901 CGACTTGCTAAATCGATTAGCAGAAAGGCATGGCTAAATAATGTTGGTGGTAAAAAA 3960

Qy 3961 TAAATAAGTAAACAAAATGAAGATTGCCCTGCTCTCTGTGCCCTAGCCTCAAAGCGTTCA 4020
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Db 3961 TAAATAAGTAAACAAAATGAAGATTGCCCTGCTCTCTGTGCCCTAGCCTCAAAGCGTTCA 4020

Qy 4021 TCATACATCACCTTAAGATTGCTATATTTGGTTATTTCTTGACAGGAGAAAAG 4080
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Db 4021 TCATACATCACCTTAAGATTGCTATATTTGGTTATTTCTTGACAGGAGAAAAG 4080

Qy 4081 ATCTAAAGATCTTATTTCATCTTTGGTTCTGGCATGACTAAGAAGCTTAAA 4140
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Db 4081 ATCTAAAGATCTTATTTCATCTTTGGTTCTGGCATGACTAAGAAGCTTAAA 4140

Qy 4141 TGTTGATAAAATATGACTAGTTGAATTACACCAAGAACCTCTCAATAAGAAAATC 4200
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Db 4141 TGTTGATAAAATATGACTAGTTGAATTACACCAAGAACCTCTCAATAAGAAAATC 4200

Qy 4201 ATGAATGCTCCACAATTCAACATACCACAAGAGAAGTTAACATTGTGTTCT 4260
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Db 4201 ATGAATGCTCCACAATTCAACATACCACAAGAGAAGTTAACATTGTGTTCT 4260

Qy 4261 ATGATTATTGTAAGACCTTCACCAAGTTCTGATATCTTTAAAGACATAGTCAAAATT 4320
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Db 4261 ATGATTATTGTAAGACCTTCACCAAGTTCTGATATCTTTAAAGACATAGTCAAAATT 4320

Qy 4321 GCTTTGAAAATCTGTATTCTGAAAATATCCTGTTGTGATTAGGTTTAAATACCA 4380
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Db 4321 GCTTTGAAAATCTGTATTCTGAAAATATCCTGTTGTGATTAGGTTTAAATACCA 4380

Qy 4381 GCTAAAGGATTACCTCACTGAGTCATCAGTACCCCTCCTATTCAAGCTCCCCAAGATGATGT 4440
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Db 4381 GCTAAAGGATTACCTCACTGAGTCATCAGTACCCCTCCTATTCAAGCTCCCCAAGATGATGT 4440
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Qy 4441 GTTTTGCTTACCCAAGAGAGGTTTCTTCTTATTTTAGATAATTCAAGTGCTTAGAT 4500
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Db 4441 GTTTTGCTTACCCAAGAGAGGTTTCTTCTTATTTTAGATAATTCAAGTGCTTAGAT 4500
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Qy 4501 AAATTATGTTTCTTAAGTGTATGGTAAACTCTTTAAAGAAAATTAAATATGTTAT 4560
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Db 4501 AAATTATGTTTCTTAAGTGTATGGTAAACTCTTTAAAGAAAATTAAATATGTTAT 4560
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Qy 4561 AGCTGAATCTTTGGTAACTTAAATCTTATCATAGACTCTGTACATATGTTCAAATT 4620
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Db 4561 AGCTGAATCTTTGGTAACTTAAATCTTATCATAGACTCTGTACATATGTTCAAATT 4620
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Qy 4621 AGCTGCTGCCTGATGTGTATCATCGGTGGGATGACAGAACAAACATATTTATGATCA 4680
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Db 4621 AGCTGCTGCCTGATGTGTATCATCGGTGGGATGACAGAACAAACATATTTATGATCA 4680
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Qy 4681 TGAATAATGTGCTTGTAAAAAGATTCAAGTTATTAGGAAGCATACTCTGTTTTAAT 4740
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Db 4681 TGAATAATGTGCTTGTAAAAAGATTCAAGTTATTAGGAAGCATACTCTGTTTTAAT 4740
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Qy 4741 CATGTATAATATTCCATGATACTTTATAGAACATTCTGGCTTCAGGAAAGTCTAGAAG 4800
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Db 4741 CATGTATAATATTCCATGATACTTTATAGAACATTCTGGCTTCAGGAAAGTCTAGAAG 4800
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Qy 4801 CAATATTCTTCAAATAAGGTGTTAAACTTT 4834
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Db 4801 CAATATTCTTCAAATAAGGTGTTAAACTTT 4834